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CARY W. BROOKS
General Motors Corporation
Mail Code 482-C23-B21
P.O. Box 300
Detroit, MI 48265-3000

EXAMINER

ONEILL, KARIE AMBER

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 08/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/616,457	Applicant(s) HERRMANN, MANFRED	
	Examiner Karie O'Neill	Art Unit 1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25, 30-33 and 44-46 is/are pending in the application.
- 4a) Of the above claim(s) 34-43 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-25, 30-33 and 44-46 is/are rejected.
- 7) ☐ Claim(s) 12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Remarks

1. Claims 1-33 and 44-46 are pending this office action. Claims 26-29 have been cancelled. Claims 34-43 are withdrawn from consideration. Claims 44-46 are new.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear what is meant by "an intended" operating pressure.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-3, 10 and 13-14 are rejected under 35 U.S.C. 102(e) as being anticipated by Condit et al. (US 6,635,370 B2).

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With regard to Claim 1, Condit et al. discloses in Figure 1, a method for the investigation of a fuel cell system, said fuel cell system (100) having an anode (104) side to which a fuel is supplied in operation and a cathode side (106) to which an oxidizing agent is supplied in operation and comprising at least one fuel cell (102), each fuel cell having an anode, a cathode and a membrane (108) separating said cathode from said anode, said method being adapted to carry out a first test comprising the test of testing an operation of said fuel cell system at a low current yield or a shut-down procedure, said first test being carried out with a mixture of at least one inert gas with at least fuel permissible for the operation of said fuel cell system, said mixture being supplied to said anode side of said fuel cell system and the amount of fuel in the mixture being predetermined such that a proportion of said fuel present in said mixture lies below a value at which mixture is flammable in air (column 1 lines 54-60).

With regard to Claims 2 and 3, Condit et al. discloses wherein said mixture includes at least 0.00001% hydrogen and the balance being inert gas, preferably nitrogen (column 1 lines 55-58).

With regard to Claim 10, Condit discloses wherein a plurality of fuel cells are combined together to form said fuel cell system in the form of a fuel cell stack and at least one first test, to test an operation of said fuel cell system at a low current yield or during the shut-down procedure, is carried out at said fuel cell stack (column 5 lines 12-14).

With regard to Claims 13-14, Condit et al. discloses the fuel cell system comprising at least first and second inlets (124, 130) and at least first and second

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outlets (126, 132) as well as a plurality of valves which are regulatable (139a, 141a, 158, 162) at least one of which is associated with each said inlet and outlet, there being lines communicating with said valves (139, 141, 160, 164), wherein a quantity of said mixture is fed into the fuel cell system, quantity is measured and valves are switched on and off in accordance with at least one of a predetermined pattern and a predetermined sequence, a measurement is made of a quantity of said mixture emerging from at least some of said lines, a sum is formed of emerging quantities and is compared with fed-in quantity to determine leakages (column 8 lines 26-40).

6. Claims 1, 7-8, 10, 13-15, 22-25 and 44-45 are rejected under 35 U.S.C. 102(e) as being anticipated by Bailey et al. (US 6,638,650 B1)

With regard to Claims 1 and 10, Bailey et al. discloses in Figures 1 and 2, a method for the investigation of a fuel cell system, said fuel cell system (102) having an anode side to which a fuel is supplied in operation and a cathode side to which an oxidizing agent is supplied in operation and comprising at least one fuel cell (108a, 108b, 108c, 108d), each fuel cell having an anode, a cathode and a membrane (111a, 110b, 110c, 110d) separating said cathode from said anode, said method being adapted to carry out a first test comprising the test of detecting transfer leaks within a plurality of fuel cells (see abstract), said first test being carried out with a mixture of at least one inert gas with at least fuel permissible for the operation of said fuel cell system, said mixture being supplied to said anode side of said fuel cell system and the amount of fuel in the mixture being predetermined such that a proportion of said fuel

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present in said mixture lies below a value at which mixture is flammable in air (column 1 lines 43-50).

With regard to Claims 7-8, Bailey et al. discloses in column 3 lines 22-24, the fuel cells being typically checked for leaks prior to operating the fuel cell , for example, after assembly or during routine maintenance.

With regard to Claims 13-15, Bailey et al. discloses the fuel cell system comprising first and second inlets (136, 126) and a plurality of valves which are regulatable (column 9 lines 2-3) at least one of which is associated with each said inlet and outlet, there being lines communicating with said valves, wherein a quantity of said mixture is fed into the fuel cell system, quantity is measured and valves are switched on and off in accordance with at least one of a predetermined pattern and a predetermined sequence, a measurement is made of a quantity of said mixture emerging from at least some of said lines, a sum is formed of emerging quantities and is compared with fed-in quantity to determine leakages (column 9 lines 10-15 and 24-33).

With regard to Claims 22-25, Bailey et al. discloses in column 9 lines 5-15, the voltage across at least one of the fuel cells in the stack is measured. Absent a reactant transfer leak, the fuel cells in the stack will generate a constant voltage dependant upon the concentration of reactants in the fuel cell and the load, in any connected to the fuel cell. A reactant transfer leak will introduce oxidant and result in a mixed potential at the anode, which may result in a measurable drop in cell voltage that can be detected by the voltmeter. The cell voltage of a given cell is compared to the cell voltages of other

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cells in the stack or a reference cell voltage. If the measured cell voltage is significantly less than the comparison cell voltage, then a reactant transfer leak is indicated.

With regard to Claims 44-45, Bailey et al. discloses the inert gas comprising nitrogen and the fuel comprises hydrogen (column 1 lines 42-48); and supplying the gases through separate gas sources having independent pressure regulation, as well as other arrangements that suitable (column 17 lines 18-25), such as supplying the gas mixture from a mixture tank in order to have better control over the mixture being supplied as well as saving space in the fuel cell system.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 4-5 and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bailey et al. (US 6,638,650 B1), as applied to Claims 1, 8, 10, 13-15, 22-25 and 44-45 above and in further view of Knights et al. (US 6,492,043 B1).

Bailey et al. discloses the method of investigation of a fuel cell system to detect a leak within the fuel cell system in paragraph 6 above, but does not disclose the first test being carried out in an environment with a normal air atmosphere, an environment with normal ventilation, and the fuel cell system comprising at least first and second inlets and at least first and second outlets wherein, during the carrying out of the first

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test, said mixture is filled at a predetermined test pressure into said fuel cell system through one of said inlets and outlets, with simultaneous, previous or subsequent closing of further ones of said inlets and said outlets out of which an exit of said mixture could take place and wherein a measurement is made whether said test pressure reduces impermissibly as a function of time.

With regard to Claims 4-5, Knights et al. discloses that in order to detect external leaks between a fuel cell fluid passage and the external environment, the monitored environment may be the surrounding environment outside the cell (column 8 lines 24-26). Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to carry out tests of the Bailey et al. reference in the environment suggested by Knights et al, because Knights et al. teaches that the environment outside of the fuel cell would be in a normal air atmosphere and have proper ventilation so as not to reduce fuel cell performance and efficiency.

With regard to Claims 11 and 12, Knights et al. discloses introducing gas into the inlet of one of the fluid passages while the outlet is sealed. The other fuel cell fluid passage inlets are sealed. Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to test for leaks within the fuel cell system as in the Bailey et al. reference by simultaneously, previously or subsequently closing further ones of inlets and outlets as in the Knights et al. reference, because Knights et al. teaches that isolation each of the inlets and outlets will help determine where the leak is coming from. The reference is silent as to the predetermined test pressure in comparison to the operating pressure. However, it is the position of the examiner that

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the criticality of the pressure during test mode and normal operation does not provide patentable distinction.

9. Claims 6-7, 9, 18-21, 30-32 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Condit et al. (US 6,635,370 B2), as applied to Claims 1-3, 10 and 13-14 above, or over Bailey et al. (US 6,638,650 B1), as applied to Claims 1, 8, 10, 13-15, 22-25 and 44-45 above.

With regard to Claims 6-7, 9 and 46, Condit et al. discloses the method of investigation for a fuel cell system in paragraph 5 above and Bailey et al. discloses the method of investigation of a fuel cell system in paragraph 6 above, but neither reference discloses at least one of said tests being carried out during or after manufacture of a vehicle incorporating said fuel cell system as a source of propulsion in order to test operability of said vehicle at a time of manufacture, wherein the first test is carried out in a workshop after repair of a vehicle containing said fuel cell system, wherein at least one of the tests is carried out on a test bed during development of said fuel cell system and the test is carried out without a test chamber. Therefore, it would have been obvious to a person of ordinary skill in the art to perform these method steps in any order since it can be held that the selection in which the process steps are carried out has little patentable weight when not distinctly claimed (MPEP 2144).

With regard to Claims 18-21, Condit et al. discloses the method of investigation for a fuel cell system in paragraph 5 above and Bailey et al. discloses the method of investigation of a fuel cell system in paragraph 6 above, but neither reference discloses

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the method in which at least one of the tests is carried out as a long term test, including a plurality of switching on or switching off processes of said valves, further including at least one regulating valve having at least one set value, wherein said long-term test also includes changes of said set value, and also including a plurality of heating up and cooling down cycles of said fuel cell system. Therefore, it would have been obvious to a person of ordinary skill in the art to perform these method steps as long term tests so as to be able to monitor, measure and evaluate the severity of the leakage, identify small leaks which may not show up during one test run and/or to narrow down the specific cell in which leakage is occurring.

With regard to Claims 30-32, Condit et al. discloses the method of investigation for a fuel cell system in paragraph 5 above and Bailey et al. discloses the method of investigation of a fuel cell system in paragraph 6 above, but neither reference discloses after successfully concluded tests occurs, a second test is carried out in the same manner as the first test. Therefore, it would have been obvious to one of ordinary skill in the art to perform a second test in the same manner as the first test, by using a different amount of gas mixture being fed into the fuel cell system to determine a different power yield of the system, in order to determine of the results of the first and second tests are similar or accurate.

10. Claims 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Condit et al. (US 6,635,370 B2), as applied to Claims 1-3, 10 and 13-14 above, or over

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Bailey et al. (US 6,638,650 B1), as applied to Claims 1, 8, 10, 13-15, 22-25 and 44-45 above, and in further view of Tomimatsu et al. (US 5,595,832).

Condit et al. discloses the method of investigation for a fuel cell system in paragraph 5 above and Bailey et al. discloses the method of investigation of a fuel cell system in paragraph 6 above, but neither reference discloses expressly wherein said fuel cell system is heated to one of an operating temperature and an excess temperature prior to and during the carrying out of any one of said tests.

Tomimatsu et al. discloses, the fuel cell being heated to an operating temperature (column 8 lines 55-56) and under a high temperature (column 11 line 16) prior to testing for a gas-crossleak amount at the exhaust output of the cathode (column 22 lines 20-30). Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to heat the fuel cell of Condit et al. or Bailey et al. to an operating temperature and a higher temperature prior to and during the carrying out of any of the tests, as in the Tomimatsu et al. reference, because Tomimatsu et al. teaches the method of making sure that the fuel cell operates at a maximum temperature and is fully functional before an investigative test is performed.

11. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Condit et al. (US 6,635,370 B2), as applied to Claims 1-3, 10 and 13-14 above, or over Bailey et al. (US 6,638,650 B1), as applied to Claims 1, 8, 10, 13-15, 22-25 and 44-45 above, and in further view of Meltser et al. (US 5,763,113).

Condit et al. discloses the method of investigation for a fuel cell system in paragraph 5 above and Bailey et al. discloses the method of investigation of a fuel cell system in paragraph 6 above, but neither reference discloses expressly wherein at least one of a fuel sensor and an inert gas sensor is used in order to determine any leakages of said mixture.

Meltser et al. discloses in column 4 lines 49-52, as part of the hydrogen leakage alert system, a hydrogen sensor communicates with the cathode exhaust gas manifold for measuring hydrogen concentration therein. Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to use a hydrogen sensor as in the Meltser et al. reference as part of the fuel cell system of Condit et al. or Bailey et al., because Meltser et al. teaches monitoring the amount of hydrogen seepage through the membrane into the cathode flow channel so as to catch the problem of leakage before it causes inefficiency in the fuel cell operation (column 4 lines 33-38).

Response to Arguments

12. Applicant's arguments, see pages 16-18, filed May 23, 2006, with respect to the rejection(s) of claim(s) 1-33 under 35 USC 112, second paragraph and Claims 1-2, 4-5 and 10-15 under 35 USC 102(b) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of newly found prior art, Condit et al. (US 6,635,370 B2) and Bailey et al. (US 6,638,650 B1).

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Examiner recognizes the changes made to overcome the 35 USC 112, second paragraph rejections. These rejections are withdrawn. Applicant asserts that the Bette et al. reference does not disclose a mixture being fed into the anode side of a fuel cell. Examiner acknowledges this point and has withdrawn the rejection of Claims 1-2, 4-5 and 10-15 but has applied new art, Condit et al. (US 6,635,370 B2) and Bailey et al. (US 6,638,650 B1), which does supply a mixed gas to the anode side of the fuel cell system.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karie O'Neill whose telephone number is (571) 272-8614. The examiner can normally be reached on Monday through Friday from 8am to 5pm.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Karie O'Neill
Examiner
Art Unit 1745

KAO



DAH-WEIYUAN
PRIMARY EXAMINER